

society will be instrumental in effecting such extensions of meteorological applications, for it will bring together various groups. The signs indicate that commercial and industrial institutions will demand meteorologists for their staffs. Through the society the teachers of meteorology, now well represented in its membership, can be led to appreciate and to prepare for this rising demand for a widespread general knowledge of weather processes and for special training on the part of a few. The biggest problem before us is forecasting the weather. One present difficulty is to get away from empirical methods. This organization can do a great deal by farming out various projects among the fellows and members whether or not they may be in governmental meteorological services.

The scientific program comprised 15 papers, of which one was read in abstract and another by title only. The program follows, together with references to the MONTHLY WEATHER REVIEW, where the papers or abstracts of them will appear or have appeared:

- Temperature scales and thermometer scales. E. W. Woolard. (This REVIEW, pp. 264-270.)  
 Shall we adopt a half-degree absolute centigrade scale instead of the Fahrenheit? Charles F. Marvin.  
 The physics of the aurora. W. J. Humphreys. (Abstract probably in June REVIEW.)  
 The auroras of March 22-25, 1920. Herbert Lyman. (Probably in June REVIEW.)  
 The most intense rainfall on record. B. C. Kadel. (This REVIEW, pp. 274-276.)  
 New aerological apparatus. S. P. Fergusson. (Probably in June REVIEW.)  
 Temperatures versus pressures as determinants of winds aloft. W. R. Gregg. (This REVIEW, p. 263.)  
 Daily wind charts for stated levels. C. LeRoy Meisinger. (This REVIEW, pp. 251-263.)  
 Cloud base altitudes as shown by disappearance of balloons and kites. O. L. Lewis. (Probably July REVIEW.)  
 Cloud nomenclature. Charles F. Brooks. (Probably July REVIEW.)  
 Some meteorological observations of a bombing pilot in France. Thomas R. Reed. (April REVIEW, pp. 216-217.)  
 Project for local forecast studies. R. H. Weightman. (March REVIEW, pp. 154-155.)  
 Climatic conditions in a greenhouse as measured by plant growth. Earl S. Johnston. (Abstract, April REVIEW, pp. 215.)  
 Modifying factors in effective temperature. Andrew D. Hopkins. (April REVIEW, pp. 214-215.)  
 Relation of rainfall to the grazing capacity of ranges. J. Warren Smith. (Probably June REVIEW.)

#### METEOROLOGICAL EXHIBIT BEFORE THE ROYAL SOCIETY.

A note in *Nature* (London), May 20, 1920, pages 373-376, tells of the various exhibits displayed upon the occasion of the Royal Society's *Conversazione* on May 12. The Meteorological Office contributed the following exhibit:

New instruments and diagrams: (1) Land aneroid and sea aneroid. (2) Barometer and micrometric adjustment. (3) Two similar synchroscopic charts and the weather of the following 15 days. (4) Normal weather on the Cairo to Cape route. (5) Charts of the average distribution of rainfall, cloudiness, and temperature over the Northern and Southern Hemispheres in January and July. (6) Map of the annual rainfall in the English Lake District. (7) Records of the magnetic disturbance of March 23-24, 1920, and photographs of aurora for height measurements. (8) Frequency of thunderstorms on the route between England and Australia and at selected stations in Africa and South America. (9) The flow of air over Kew Observatory, Richmond, during the last three years.

#### THE INTENSITY OF NOCTURNAL RADIATION AT HIGH ELEVATIONS.

By A. BOUTARIC.

[Abstracted from *Comptes Rendus*, Paris Acad., May 17, 1920, pp. 1195-1196.]

The author has shown in his previous work<sup>1</sup> that the intensity of nocturnal radiation,  $r$ , may be expressed as a function of the absolute temperature of a black radi-

ating surface and the vapor pressure in its immediate vicinity, as follows:

$$r = \pi \sigma \theta_0^4 F(f_0),$$

in which  $\pi \sigma$  is a constant, depending upon the total of directions in which the surface is radiating;  $\theta_0$ , the absolute temperature, and  $f_0$ , the vapor pressure.

Work which was conducted at the Pic du Midi (2,859 meters elevation) between August 11 and 24, 1919, when compared with the results obtained at Montpellier (practically sea-level) in 1913, 1914, and 1915, leads to the conclusion that the value of  $r$  is independent of the altitude when the conditions of temperature and vapor pressure are the same. This is shown in the following table:

TABLE 1.

Date.	Time.	$t_0$	$t_0$	$r^1$	$F(f_0)$	
					Pic du Midi.	Montpellier.
Aug. 11.....	h. m.	° C.	Mm.			
14.....	20 24	11.2	4.8	0.161	0.321	0.300
16.....	21 00	11.3	5.6	0.138	0.275	0.284
17.....	21 00	9.8	2.3	0.170	0.346	0.362
18.....	21 00	8.0	2.1	0.168	0.351	0.368
19.....	21 15	7.4	5.4	0.158	0.333	0.292
20.....	21 00	10.1	4.2	0.154	0.312	0.312
22.....	21 00	7.0	3.4	0.139	0.294	0.330
23.....	21 00	7.9	1.9	0.154	0.322	0.374
24.....	20 50	8.0	3.4	0.150	0.313	0.330

<sup>1</sup> Gm. cal./sq. cm./min.

—C. L. M.

#### THE INFLUENCE OF THE VARIATION OF THE BAROMETRIC PRESSURE ON THE MICROBIAL DROPLETS IN SUSPENSION IN THE ATMOSPHERE.

By A. TRILLAT.

[Abstracted from *Comptes Rendus*, Paris Academy, vol. 170, pp. 538-540, Mar. 1, 1920.]

The atmosphere, especially in the vicinity of inhabited regions, contains numerous microbe-bearing droplets projected into the air in the acts of speaking and breathing.

Laboratory experiments have shown that a sudden decrease in the air pressure accelerates the fall of such droplets, through the increase of their weight brought about by condensation upon them as a result of the cooling. A slow decrease of pressure produces but a limited effect. Other factors, such as the purity, relative humidity, etc., of the air also affect the result.

In the light of such experiments it is surmised that a rapid fall in the barometric pressure would precipitate the invisible microbial droplets in the atmosphere; at the same time such a depression would liberate gases from the soil which contribute to the vitality of the organisms; hence the effect of barometric fluctuations on the vitality of the germs in the atmosphere, their concentration in the lower strata, and their precipitation upon the soil may be an important factor in the variation of the bacteriological composition of the atmosphere.—E. W. W.

#### WIRELESS WEATHER REPORTS OF THE METEOROLOGICAL OFFICE.

[Reprinted from *Nature*, June 10, 1920, p. 465.]

In the *Meteorological Magazine* for May a notice is given of the circulation of forecasts by wireless telegraphy from collective weather reports for London and southeast England. Hourly reports of meteorological information prepared by the Forecast Service of the Meteorological

<sup>1</sup> Boutaric, A.: *Thèse*, Paris, 1918 (pages following 138.)

Office are sent out from the wireless station of the Air Ministry. The message is given in code form, which is practically the same as that prescribed in Annex G of the "Convention relating to International Air Navigation," Paris, 1919. The forecasts, which are being issued eight times a day, are based on observations taken about half an hour before the time of issue. Detailed explanation of the code can be obtained on application at the Meteorological Office. A new device is also mentioned for making the meteorological reports rapidly available to the public. A large weather map is exhibited daily at the Air Ministry in one of the front windows on the ground floor of the Empire House, Kingsway. All the principal reporting stations in the British Isles, as well as a few neighboring Continental ones, are marked on the chart, which is on the Mercator projection, and is 10 feet high and 6 feet wide. The information on the chart is changed at about 3 h., 8 h. 30 m., and 14 h. 30 m. G. M. T., the data exhibited referring to observations made at 1 h., 7 h., and 13 h. G. M. T. \* \* \*

#### ON THE APPLICATION OF CIRRUS TO THE FORECASTING OF WEATHER.

By GABRIEL GUILBERT.

[Abstracted from *Comptes Rendus, Paris Acad.*, June 7, 1920, pp. 1398-1399.]

The following rules for the forecasting of weather have been deduced from the observation of cirrus clouds:

1. Cirri come from the center of the depression: Cirri from the north indicate a LOW in the north; cirri from the south indicate a LOW in the south.

2. The speed of the cirrus is directly related to the strength of the cyclone; rapid movement indicates a deep depression, slow movement indicates a shallow depression.

3. In the same manner that cirri can be used to forecast a depression, even before the depression has appeared, the known location of a depression can be utilized for forecasting cloudiness.

The following facts are shown by observation:

1. That the initial direction of the movement of the depression is the same as that of the cirrus, but that the path of the depression is independent of the direction of cirrus. They may coincide, but this is only accidental. The same is true of the speed, i. e., rapidly moving cirrus may precede a slowly moving depression or vice versa.

2. That the cirri form an integral part of the march of cloudiness, which have been designated by the author since 1886 as the *succession nuageuse*, and that this succession of clouds is independent of the depression.

3. That the forecasting of weather by cirrus must be subordinated to the survey of the barometric situation which can readily render the arrival of cirrus an unreliable criterion.

The use of cirri in connection with the weather map may thus afford an accurate and reliable method of forecasting. The author has used this method with success for many years, and has presented his views in a work entitled *Nouvelle méthode de prévision du temps*, published in Paris in 1909.—C. L. M.

#### RELATION OF WEATHER TO FRUITFULNESS IN THE PLUM.

In Paper No. 162, Journal Series, Minnesota Agricultural Experiment Station, Mr. M. J. Dorsey discusses the effect of weather on the setting of plum fruit. The

erratic productive nature of this fruit, exemplified in over-production one year and perhaps complete failure in another, sometimes regardless of the number of fruit-buds appearing, led to an attempt to determine the cause of this wide difference from year to year in the fertilization process.

The study is based on meteorological and fruiting data collected during a period of 7 years. It was found that no fruit set from wind-carried pollen when insects were excluded. It was concluded, therefore, that wind may be regarded as having a more indirect than direct bearing on the setting of fruit, in that its influence upon bee flight may be serious at certain times, bees being the chief pollinizer of the plum.

Temperature is considered of primary importance from three standpoints: Its effect upon pollen or pistil; its influence upon pollen tube growth; and its interference with bee flight. The time required for germination was considerably increased as a result of low temperature. The action of low temperature in retarding pollen tube growth is considered as one of the principal causes of the failure of fruit to set, as it was shown that plum pollen does not germinate at temperatures below 40°, and even at 51° there is slow pollen tube growth. Sunshine showed no direct bearing on the fertilization.

Rainfall was found to have a more direct effect than any of the other weather elements. Anthers close rapidly when coming into contact with water and remain closed as long as they are wet, preventing pollination under such conditions, and, furthermore, rain prevents insect flight.

In summarizing it is pointed out that unfavorable weather at blooming time may completely prevent the setting of fruit, even though there be a full bloom, and that rain and low temperatures are the most important factors, although strong wind when prolonged is important. The greatest damage from low temperature is in the retarding of pollen tube growth. Cloudiness has no injurious effect in the setting of fruit, but rain, by causing the anthers to close or preventing them from opening, prevents pollen dissemination. In one season, rain during bloom may be the limiting factor, while in another it may be low temperatures during the period of tube growth.—*Nat'l Weather and Crop Bull.*

#### MONTANA RAINFALL.

By EDMUND BURKE and REUBEN M. PINCKNEY.

[Excerpts and abstract from "A further report on Montana climate," Circular 87, Univ. of Montana Agricultural Experiment Station, Bozeman, Mont., Sept., 1919, 15 p.]

The growing season 1919 was the third consecutive one with light precipitation in Montana, and it was "not only the driest of the three but also the hottest and driest of which we have any record. This, coupled with a light snowfall last winter, has caused the greatest scarcity of water, not only for dry-land farming but for irrigation and city supplies, ever known. The scarcity of moisture has probably never been felt more keenly than this year, and it is therefore but natural that the people are unusually interested in weather conditions. It is the purpose of this circular to present sufficient data to give the public a comprehensive idea of precipitation in the past, since it is safe to assume that like conditions will occur in the future. The data given are taken from stations with fairly complete records and so located that the State as a whole is well represented."

In order to answer the frequent question, "How much moisture falls in Montana?" the authors selected 30 stations representing the entire State and averaged the records. For convenience the State was divided into